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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,175	02/19/2004	Mark S. Wallace	040159	7289
23696	7590	11/15/2006	EXAMINER	
QUALCOMM INCORPORATED 5775 MOREHOUSE DR. SAN DIEGO, CA 92121			TSE, YOUNG TOI	
			ART UNIT	PAPER NUMBER
			2611	

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/783,175

Applicant(s)

WALLACE ET AL.

Examiner

YOUNG T. TSE

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-3, 7-8, 10, 12, 14-16, 18-20, 22-23, 25-35, 38 and 41 is/are allowed.
- 6) ☒ Claim(s) 4-6, 9, 11, 13, 17, 21, 24, 36, 37, 39, 40, 42 and 43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 20051007.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement filed October 7, 2005 fails to comply with 37 CFR 1.98(a)(1), which requires the following: (1) a list of all patents, publications, applications, or other information submitted for consideration by the Office; (2) U.S. patents and U.S. patent application publications listed in a section separately from citations of other documents; (3) the application number of the application in which the information disclosure statement is being submitted on each page of the list; (4) a column that provides a blank space next to each document to be considered, for the examiner's initials; and (5) a heading that clearly indicates that the list is an information disclosure statement. The information disclosure statement has been placed in the application file, but the information referred to therein has not been considered.

Two copies of non-patent literature documents XP-002330243 and XP-002330244 are submitted together with FORM PTO-1449. However, the two documents are not listed in the FORM PTO-1449, therefore, the documents have not been considered by the examiner.

### ***Drawings***

2. The drawings are objected to because reference character "426" shown in Fig. 3 should be "326" as mention in paragraph [0061] of the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to

avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: the reference characters "644" and "688" shown in Fig. 6 are not mentioned in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of

an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

4. Claims 4-6, 9, 11, 13, 17, 21, 24, 36-37, 39-40 and 42-43 are objected to because of the following informalities:

In line 1 of claims 4-5, 36 and 42, "a second" should be "the second". Wherein claim 37 depends on claim 36 and claim 43 depends on claim 42.

In claim 5, line 4, "the second matrix" should be "the second matrix of eigenvectors". Wherein claim 6 depends on claim 5.

In claim 9 (line 1) and claim 11 (line 4), "partial derivatives" should be "the partial derivatives".

In claim 13, lines 3-4, "an error matrix, deriving partial derivatives, computing an update vector" should be "the error matrix, deriving the partial derivatives, computing the update vector".

In claim 17, lines 3-4, "an error matrix, computing an aggregate error, deriving partial derivatives" should be "the error matrix, computing the aggregate error, deriving the partial derivatives".

In claim 21, line 4, "the subband" should be "the subbands".

In line 1 of claims 24 and 39-40, "is operative" should be "is further operative".

Appropriate correction is required.

***Allowable Subject Matter***

5. Claims 1-3, 7-8, 10, 12, 14-16, 18-20, 22-23, 25-35, 38 and 41 are allowed.
6. Claims 4-6, 9, 11, 13, 17, 21, 24, 36-37, 39-40 and 42-43 would be allowable if rewritten or amended to overcome the objection(s) set forth in this Office action.
7. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to show or suggest a method or an apparatus of calibrating downlink and uplink channels in a wireless multiple-input multiple-output (MIMO) communication system, comprising the steps of or perform by a controller for deriving a first transmit matrix based on a first pilot received via a MIMO channel between a transmitting entity and a receiving entity and deriving a second transmit matrix based on a MIMO channel response estimate and first and second calibration error matrices, the MIMO channel response estimate being an estimate of a response of the MIMO channel and derived based on a second pilot received via the MIMO channel, the first calibration error matrix containing estimates of errors in a first correction matrix used to account for responses of transmit and receive chains at the transmitting entity, and the second calibration error matrix containing estimates of errors in a second correction matrix used to account for responses of transmit and receive chains at the receiving entity. The prior art also fails to show or suggest a method or an apparatus of calibrating downlink and uplink channels in a wireless multiple-input multiple-output

(MIMO) communication system, comprising the steps of or perform by a controller for performing a first calibration based on downlink and uplink channel response estimates for a MIMO channel between a transmitting entity and a receiving entity to obtain first and second correction matrices, the first correction matrix being used to account for responses of transmit and receive chains at the transmitting entity and the second correction matrix being used to account for responses of transmit and receive chains at the receiving entity and performing a second calibration based on first and second pilots received via the MIMO channel to obtain first and second calibration error matrices, the first calibration error matrix containing estimates of errors in the first correction matrix and the second calibration error matrix containing estimates of errors in the second correction matrix.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References Raleigh et al., Ling et al., Kadous, Walton et al., and Subramaniam et al. are all related wireless multiple-in multiple-out (MIMO) communications systems for generating transmit matrices and correction matrices between transmitting entry and receiving entry.

9. This application is in condition for allowance except for the following formal matters:

The objection of figures 3 and 6 and claims 4-6, 9, 11, 13, 17, 21, 24, 36-37, 39-40 and 42-43.

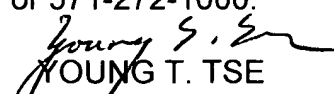
Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOUNG T. TSE whose telephone number is (571) 272-3051. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
YOUNG T. TSE  
Primary Examiner  
Art Unit 2611